

FRC 2019 Software and Firmware Setup

(last updated Feb 09, 2019)

Current Versions:

Java 11.0.2
Gradle 5.0
National Instruments FRCUpdate 2019.2.0
Driver Station 19.0
RoboRio 2019_V14
WPILib 2019.4.1
VSCode 1.30.1
Talon SRX Firmware 4.11
PDP 1.4
PCM 1.65
Radio 19.1.1
NavX 3.1.347
Limelight 2019.5.1

INSTALLING DEVELOPMENT SOFTWARE AND DRIVER STATION

Uninstall: (if you have old versions installed)

National Instruments Software (from Apps & features) – select ‘Remove All’

Gradle 4.9 (just delete folder – probably at c:\program files\gradle 4.9)

VSCode (install VSCode via the WPILibInstaller to get FRC templates – uninstall from Apps & features)

IntelliJ (if you have an older version)

Java (older version of Java such as JDK-8)

CTRE

FRC Radio

navX

Install:

Git

TortoiseGit (optional)

IntelliJ

Java

Gradle

WPILib (WPILib and VSCode)

FRCUpdateSuite (Driver station - optional)

CTRE.Phoenix.Framework (Lifeboat for updating Talon firmware - optional)

FRC_Radio_Configuration (to update radio firmware and configure radio - optional)

navX

Limelight (update limelight image – optional)

Detail Notes:

GIT

- Git-x.x.x-64-bit
- download installer from: www.git.scm.com/downloads
- double click exe
- accept defaults

TortoiseGit

- TortoiseGit-x.x.x-64bit
- download installer from: www.tortoisegit.org/download
- accept defaults

IntelliJ

- idealC-201x.x.x
- download installer from: www.jetbrains.com/idea/download
- use community edition
- check 64bit installer, add Open folder in Project, java
- configure at you like accepting defaults
- when opening a project, check 'Use auto imports' and 'Create directories for ...'
- set Gradle Home to c:\program files\gradle-5.0-all\gradle-5.0
- set Gradle JVM to 'Use project JDK (11, ...)
- gradle should compile
- allow firewall access

Java

- jdk-xx.x.x_windows-x64_bin
- download installer from: <https://www.oracle.com/technetwork/java/javase/downloads/jdk11-downloads-5066655.html>
- accept defaults

Gradle

- Gradle-x.x-all
- download folder from: www.gradle.org/install
- click Install Manually
- click download
- complete v5.0 complete
- copy gradle-5.0-all folder into c:\program files\

FRC Update Suite (National Instruments - driver station)

- FRCUpdateSuite_201x.x.x.zip
- make sure your PC has a connection to the Internet as the software will need to activate the license
- download zip from: <http://www.ni.com/download/first-robotics-software-2017/7904/en/>
- double click setup.exe
- accept defaults
- enter you name and team1619 for the organization
- enter B04P63221 for the serial number
- accept license agreements

- run license manager to active the products
- log into your account. If you don't have one, just set one up.
- click [Activate]
- restart computer

Serial Number: B04P63221

Product: Vision Runtime

Version: 18.0

Activation Code: MYMN-PXBH-BQ2X-PR6B-9CZL

Computer ID: 8223-GFGD-2XNX-BQMD

WPILib and VSCode

- WPILibInstaller_Windows64-2019.x.x.zip
- download zip from <https://github.com/wpilibsuite/allwpilib/releases>
- double click exe
- click [All Users]
- click [Select/Download VS Code]
- click [Download]
- uncheck C++ Compiler
- make sure Visual Studio Code, Gradle, and Java JDK/JRE are checked
- leave Tools and Utilities, WPILib Dependencies, and Visual Studio Code Extensions checked
- click [Execute Install]

CTRE (talons)

- CTRE.Phoenix.Framework.vx.xx.x.x
- download zip from: http://www.ctr-electronics.com/hro.html#product_tabs_technical_resources
- instructions at https://phoenix-documentation.readthedocs.io/en/latest/ch05_PrepWorkstation.html
- double click CTRE.Phoenix.Framework.vx.xx.x.x.exe
- accept defaults
- click [install] with ☐ trust... checked

Radio

- FRC_Radio_Configuration_xx_x_x
- download installer from: https://wpilib.screenstepslive.com/s/currentCS/m/getting_started/l/144986-programming-your-radio
- double click FRC_Radio_Configuration_xx_x_x.exe
- accept defaults
- allow WinPCap to be installed
- accept defaults

navX

- navX x.x.xxx
- download https://www.kauailabs.com/public_files/navx-mxp/navx-mxp.zip
- run setup.exe
- this will install the navXUI, navXFirmwareUpdater, navXConfig, and navXMagCalibrator
- to update the firmware, you might need to replace the ST files

Updating Limelight Firmware:

- Instructions at http://docs.limelightvision.io/en/latest/getting_started.html#imaging
- Download Bonjour, USB drivers, New Flash Tool for 2019 and image at:
<https://limelightvision.io/pages/downloads>

UPGRADING ROBOT FIRMWARE:

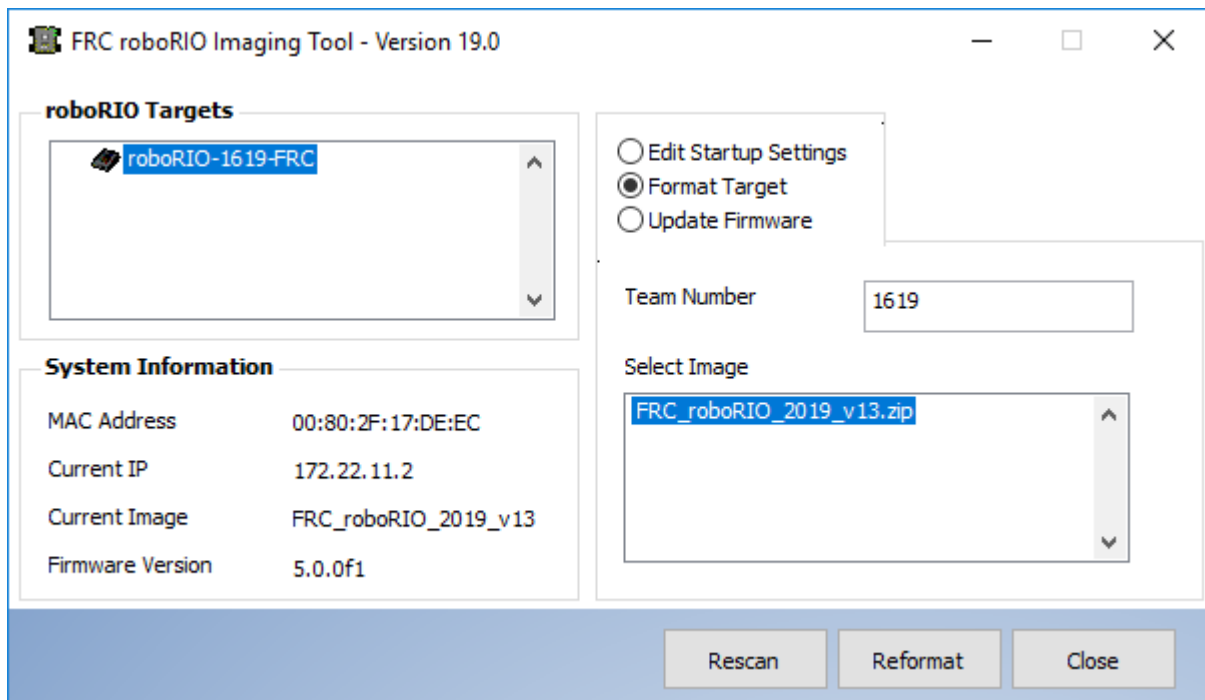
Roborio:

Run - roboRIO Imaging Tool.exe



roboRIO
Imaging Tool

Set up as shown below and click [Reformat]



Talons, PDP, and PWM:

Connect USB cable from PC to RoboRio

Run - Phoenix Tuner.exe



Click [Install Phoenix Library/Diagnostics]

Phoenix Tuner Version (1.0.2.0)

Options Tools Windows Help | Selected Device: ▾

Robot Controller Install CAN Devices Control Config Self-Test Plot

Phoenix Tuner provides field-upgrade, configuration, and self-test for CTRE CAN Devices. This software communicates to the Phoenix Diagnostics Server (ported from the 2018 roboRIO). You must first install Diagnostic Server into the roboRIO - this only needs to be done once after RIO imaging.

To install, connect a RoboRIO to the PC using USB, and select 172.22.11.2 # RoboRIO Over USB in the server address drop down below. Then press **Install Phoenix Library/Diagnostics**.

You may enter your team number or roboRIO IP address for server address, this is necessary to connect wirelessly to your robot. Tuner will react automatically when you change the

To uninstall the Diagnostics server, press **Uninstall Phoenix Diagnostics**. This will uninstall Diagnostics Server only.

Diagnostic Server Address or Team Number

172.22.11.2 # RoboRIO Over USB ▾

Port: 1250 # Default Port ▾

Written file: /usr/local/frc/bin/Phoenix-diagnostics-server (Phoenix-diagnostics-server)
Written file: /etc/init.d/Phoenix-diagnostics-server (Phoenix-diagnostics-server)
Written file: /usr/local/frc/third-party/lib/libCTRE_PhoenixCCI.so (libCTRE_PhoenixCCI.so)
Written file: /var/local/natinst/www/HUFF/pages/SystemConfig.js (SystemConfig.js)
Updating File Write Permissions
chmod 777 /etc/init.d/Phoenix-diagnostics-server
chmod 777 /usr/local/frc/bin/Phoenix-diagnostics-server
chmod -x /usr/local/frc/third-party/lib/libCTRE_PhoenixCCI.so
chown lvuser /usr/local/frc/third-party/lib/libCTRE_PhoenixCCI.so
Updating Library Links
ldconfig /usr/local/frc/third-party/lib/
Syncing RoboRIO to ensure files are on the flash
sync
Creating/Updating Symlink for startup
ln -sf /etc/init.d/Phoenix-diagnostics-server /etc/rc5.d/S25Phoenix-diagnostics-server
Starting Server
Starting Phoenix Diagnostics
Server has successfully started.
Duration: 00:00:08.64

Install/Uninstall

☒ Insert helpful animation in roboRIO WebServer

Install Phoenix Library/Diagnostics

Uninstall Phoenix Diagnostics

Force Diagnostic Server On/Off

Force Start Server

Force Stop Server

Click

Install Success

Phoenix API and Diagnostic Server is installed successfully.
If using C++/Java, you may want to redeploy your application.

OK

Click the [CAN Devices] tab

Select Talon

Change ID and click [Change ID]

Select device, select firmware file, and click [Update Devices]

(you can update all Talons at once by checking ☒ "Update all Talon SRX devices")

Talon = TalonSrx-Application-4.11-season2019.crf

PDP = PDP-Application-1.40.crf

PWM = PCM-Application-1.65.crf

Phoenix Tuner Version (1.0.2.0)

Options Tools Windows Help | Selected Device: Talon SRX (Device ID 0)

Robot Controller Install **CAN Devices** X Control Config Self-Test Plot

Devices (Count: 11)	Software Status	Hardware	ID	Firmware Version	Manufacturer Date	Bootloader Revision	Hardware Version	Vendor
PCM (Device ID 0)	Running Application.	PCM	00	1.65	June 17, 2015	3.0	1.6	Cross The Road Elec...
PDP (Device ID 0)	Running Application.	PDP	00	1.40	Nov 4, 2014	3.1	Smart Module 1.1, B...	Cross The Road Elec...
Talon SRX (Device ID 0)	Running Application.	Talon SRX	00	4.11	Aug 14, 2015	3.2	1.7	Cross The Road Elec...
Talon SRX (Device ID 1)	Running Application.	Talon SRX	01	4.11	Aug 14, 2015	3.2	1.7	Cross The Road Elec...
Talon SRX (Device ID 12)	Running Application.	Talon SRX	12	4.11	Nov 3, 2014	2.6	1.4	Cross The Road Elec...
Talon SRX (Device ID 13)	Running Application.	Talon SRX	13	4.11	Nov 3, 2014	2.6	1.4	Cross The Road Elec...
Talon SRX (Device ID 14)	Running Application.	Talon SRX	14	4.11	Aug 14, 2015	3.2	1.7	Cross The Road Elec...
Talon SRX (Device ID 15)	Running Application.	Talon SRX	15	4.11	Aug 14, 2015	3.2	1.7	Cross The Road Elec...
Talon SRX (Device ID 2)	Running Application.	Talon SRX	02	4.11	Nov 3, 2014	2.6	1.4	Cross The Road Elec...
Talon SRX (Device ID 3)	Running Application.	Talon SRX	03	4.11	Nov 3, 2014	2.6	1.4	Cross The Road Elec...
Talon SRX (Device ID 5)	Running Application.	Talon SRX	05	4.11	Nov 3, 2014	2.6	1.4	Cross The Road Elec...

General Device Configuration

Change the ID: 0

Change the name: Talon SRX (Device ID 0)

Press to animate device LEDs and confirm ID is correct.

Field-Upgrade Device Firmware

Select CRF and Press "Update Firmware" to flash new firmware.

electronics\LifeBoat\HERO Firmware Files\TalonSrx-Application-4.11-season2019.crf

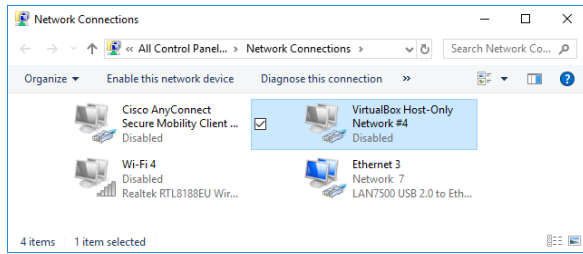
☒ Update all Talon SRX devices.

Change Talon IDs

Update Talon Firmware

Radio:

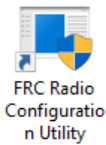
Disable Wifi adapters and extra LAN adapters so you only have one Ethernet adapter enabled



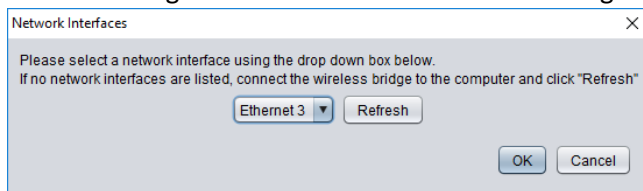
Connect Ethernet cable from PC to Radio

Power Radio either with a separate adapter or by turning on the robot

Run - FRC Radio Configuration Utility.exe



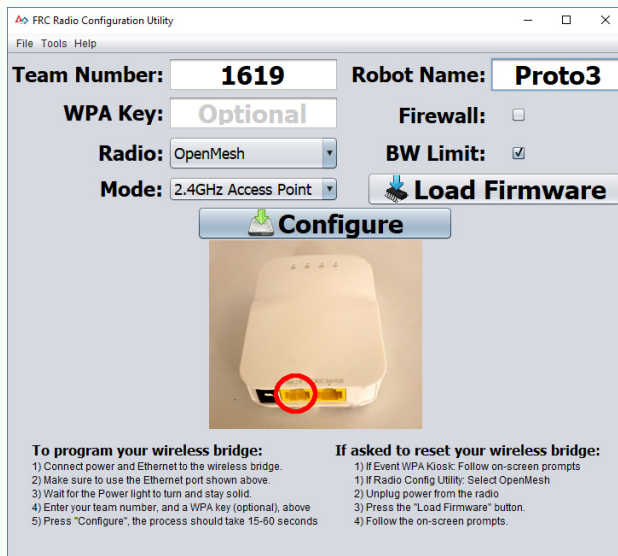
Select the single LAN connection that is connecting the Radio to the PC

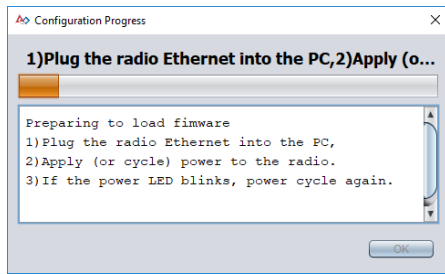


Enter the Team Number

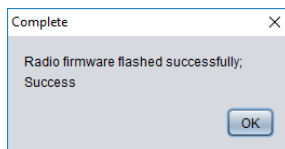
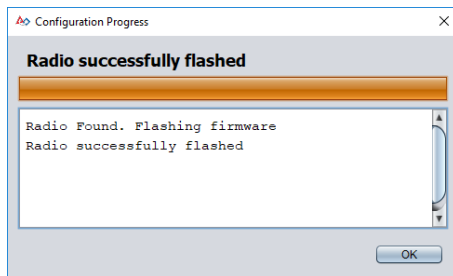
Enter the Robot Name

Click [Load Firmware]

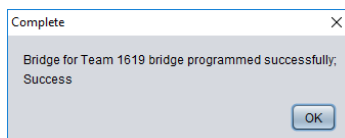
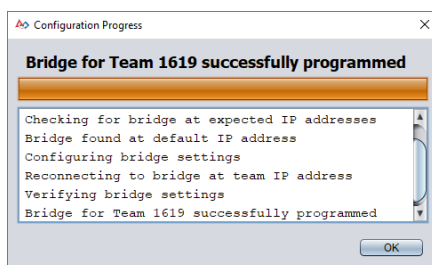
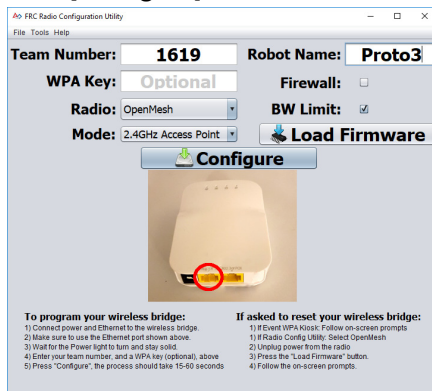




Unplug power from Radio and plug it back in to power cycle the radio.

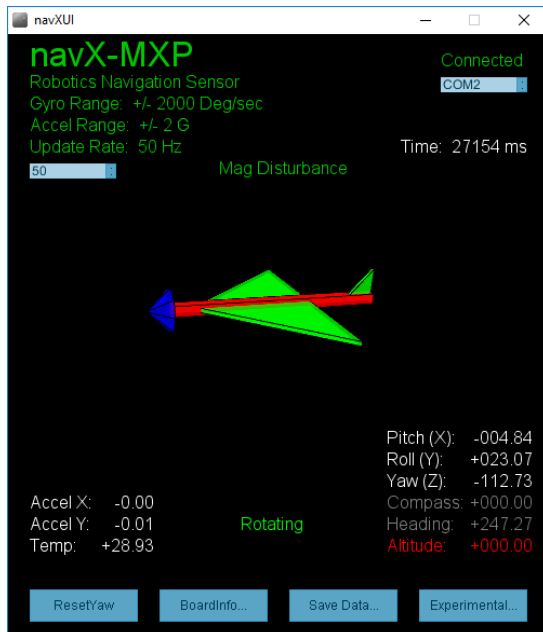


Click [Configure]

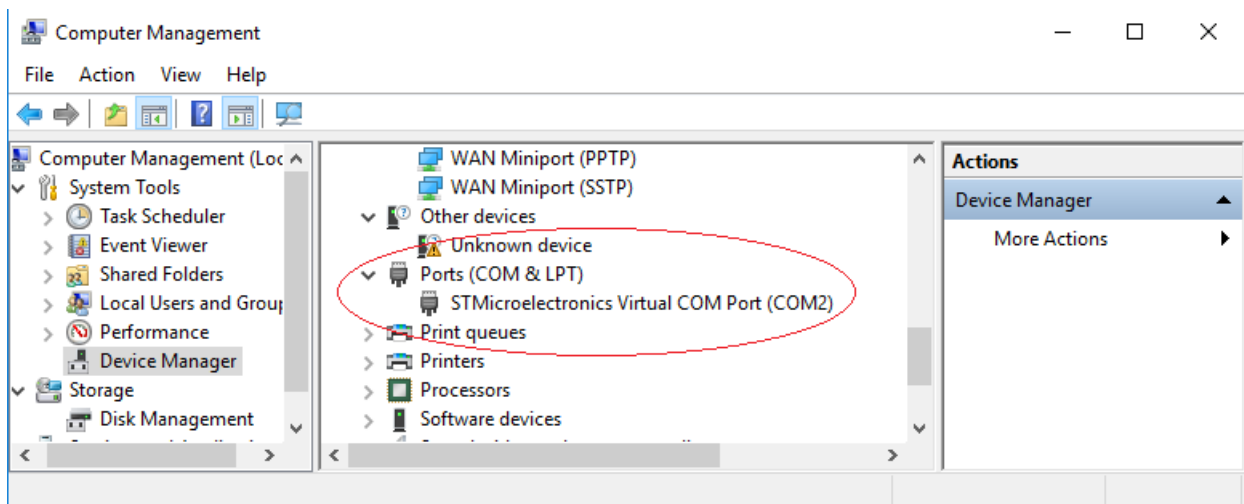


navXUI:

- This is a UI that shows the values read from the navX
- Connect navX to PC via USB cable
- Run navXUI



If you are not connecting to the navX, check the USB driver



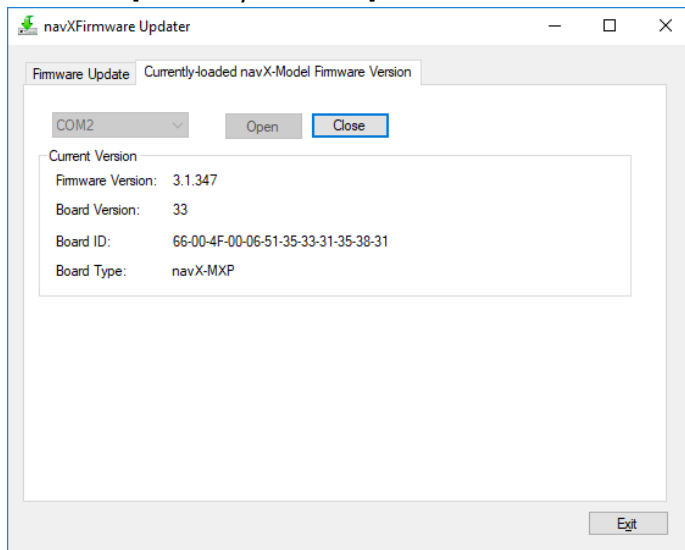
If you do not see the navX as a COM Port, try running VCP_V1.5.0_Setup_W8_x64_64bits.

navX Calibrating

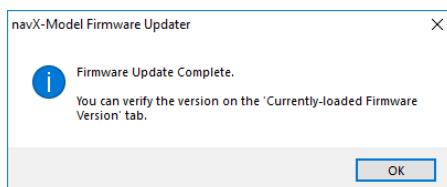
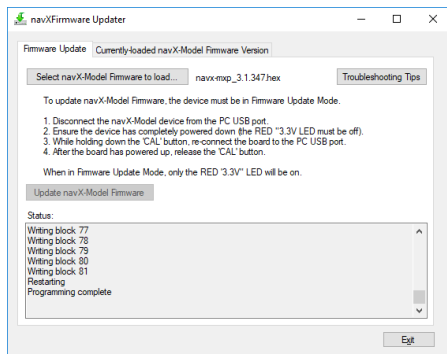
- The navX needs to be calibrated when placed into a new orientation
- Place board in the desired orientation
- Power up navX,
- Hold down Cal button on the board for 5 seconds
- Let go of the button
- The red light in front of button should blink on and then off
- Press and release the reset button on the board
- The two green lights should blink off and then on

navX Firmware Updater:

- Run navXFirmwareUpdater
- Connect the navX to the PC with a USB cable
- Click the [Currently-loaded ...] tab to see the current firmware version



- Click the [Firmware Update]
- Click [Select navX-Model Firmware to load]
- Select C:\Users\username\navx-mxp\firmware\navx-mxp_3.1.347.hex
- Unplug navX from USB cable
- Hold down the cal button on the navX board while plugging it back into the USB cable
- Release Cal button
- Click [Update navX-Model Firmware]



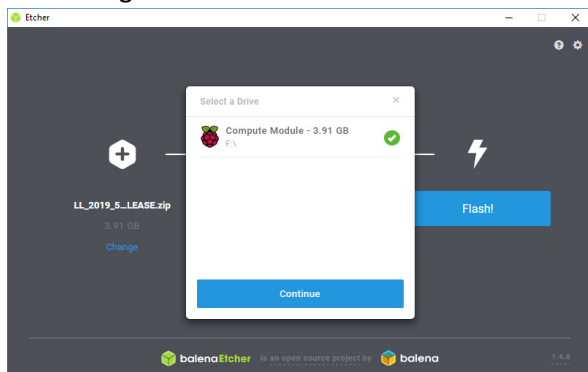
Updating Limelight Firmware:

- Instructions at http://docs.limelightvision.io/en/latest/getting_started.html#imaging
- Download Bonjour, USB drivers, New Flash Tool for 2019 and image at:
<https://limelightvision.io/pages/downloads>
- Install Bonjour if needed
- Install USB drivers
- Do not use a Windows 7 machine.
- Remove power from your limelight.
- **Unplug any secondary camera from the Limelight USB port.** (flash tool will not see drive otherwise)
- Run a USB-MicroUSB cable from your laptop to your limelight.
- Apply power to your limelight.
- Run "Balena Etcher".(balenaEtcher-Portable-1.4.8-x64.exe)
- It may take up to 20 seconds for your machine to recognize the camera.
- Select the latest .zip image in your downloads folder
- Select a "Compute Module" device in the "Drives" menu
- Click "Flash"
- Once flashing is complete, remove power from your limelight

USB Drivers:



Flash image:



Logger

Disable: log4j2.xml -> comment out

```
<AppenderRef ref="AsyncFileLogger" level="ALL"/>
```

Get/Delete files on RoboRio (no password)

Site Manager

..... RoboRio

Comments

Site Name
RoboRio

Host / IP / URL
roboRIO-1619frc.local Advanced

Username
lvuser ☒ Anonymous

Password
***** ☐ Don't save password

Port
22

Timeout
60

Retries
2 ☐ Retry On

☒ PASV ☐ Use Proxy

Connection
SSH/SFTP

SSL Options
☒ SSL Listings ☒ SSL Transfer ☐ Clear (CCC)
☐ OpenSSL ☐ Windows SSL

New Site

New Category

Connect

Connect Manager

Close